II. *An Account of the Evaporation of Water, as it was Experimented in* Greſham Colledge *in the Year 1693. With ſome Obſervations thereon. By* Edm. Halley.

IN order to explain the Circulation of Vapour Experimentally, I cauſed an Experiment of the Quantity of Vapour ariſing ſimply from the warmth of the Water, without being expoſed either to Sun or Wind, to be made in *Greſham Colledge*, which has been performed with great Care and Accuracy by Mr. *Hunt*, Operator to the Society: Having added up into one Sum the Evaporations of the whole Year, I find that, from a Surface as near as could be meaſured of 8 Square Inches, there did Evaporate during the Year, 16292 Grains of Water, which is 64 Cube Inches of Water, and that divided by 8 Inches the Area of the Water's Surface, ſhews that the depth of Water evaporated in one Year amounts to 8 Inches. But this is much too little to anſwer to the Experiments of the *French*, who found that it rained 19 Inches Water in a Year at *Paris*. Or thoſe of Mr. *Townley*, who by a long continued Series of Obſervations has ſufficiently proved that, in *Lancaſhire* at the foot of the Hills, there falls above 40 Inches of Water in the Years time. Whence it is very obvious, that the Sun and Wind are much more the cauſes of Evaporation, than any internal heat, or agitation of the Water. The ſame Obſervations do likewiſe ſhew an odd quality in the Vapours of Water, which is that of adhering to the Surface that exhaled them, which they cloath as it were with a Fleece of Vaporous Air, which once inveſting it, the Vapour riſes afterwards in much leſs quantity: which was ſhewed by the ſmall quantity of Water that was loſt in 24 hours time,

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when the Air was very ſtill from Wind, in proportion to what went away when there blew a ſtrong gale, although the Experiment were made, as I ſaid, in a place as cloſe from the Wind as could well be contrived. For which reaſon I do not at all doubt, that had the Experiment been made where the Wind had come freely, it would have carried away at leaſt three times as much as we found, without the aſſiſtance of the Sun, which might perhaps have doubled it. By the ſame Experiment it likewiſe appears, that the Evaporations in *May*, *June*, *July*, and *Auguſt*, which are nearly equal, are about three times as much as what evaporated in the four Months of *November*, *December*, *January*, and *February*, which are likewiſe nearly equal: *March* and *April* anſwering nearly to *September* and *October*. This Fleece of Vapour in ſtill Weather hanging on the ſurface of the Water, is the occaſion of very ſtrange Appearances by the refraction of the ſaid Vapours differing from that of the Common Air, whereby every thing appears raiſed; as Houſes like Steeples, Ships as on Land above the Water, and the Land raiſed, and as it were lifted from the Sea, and many times ſeeming to over-hang. And this may give a tolerable Account of what I have heard of ſeeing the Cattle at *High-water-time* in the *Iſle of Dogs* from *Greenwich*, when none are to be ſeen at *Low-water*, (which ſome have endeavoured to explain by ſuppoſing the *Iſle of Dogs* to have been lifted by the *Tide* coming under it.) But the evaporous *effluvia* of Water, having a greater degree of refraction than the *Common Air*, may ſuffice to bring thoſe Beams down to the Eye, which when the Water is retired, and the Vapours ſubſided with it, paſs above, and conſequently the Objects ſeen at the one time, may be conceived to diſappear at the other.

A TABLE ſhewing the Evaporations of Water, Anno 1693. *with the heights of the* Thermometer *and* Barometer *at* 8 *of the Clock each Morning.*

January.

D.	Grain.	Ther	Barometer.
1	31 ½	5	29, 7 Froſt.
2	21	14	29, 7 ſome Ra.
3	21	12	29, 7
4	23 ½	8	29, 7
5	23 ½	8	30, 1
6	26 ½	1	30, 5 Froſt.
7	31	— 3	30, 5 Froſt.
8	25	— 5	30, 4 Froſt.
9	23	— 3	30, 4 Froſt.
10	18	0	30, 4
11	18	0	30, 4
12	18	0	30, 4
13	22	— 6	30, 3 Froſt.
14	20 ½	— 7	30, 3 Froſt.
15	21 ¼	—10	30, 3 Froſt.
16	24	—15	30, 4 Froſt.
17	18	—13	30, 3 ½ Froſt.
18	18	—11	30, 2 Froſt.
19	14	—10	30, 1 Froſt.
20	14	— 3	29, 6
21	21	0	29, 9
22	18	2	29, 9
23	18 ½	0	30, 0 Froſt.
24	18 ½	— 3	30, 0 Froſt.
25	14 ½	9	29, 9
26	14 ½	14	29, 7
27	20	17	29, 2
28	36	10	29, 7
29	27 ½	15	29, 5 ſome Ra.
30	27 ½	15	29, 7
31	27	27	29, 6

675 Grains.

February.

D.	Grain.	Ther	Barometer.
1	36	29	30, 0
2	27	26	30, 2
3	33	25	30, 2
4	48	16	29, 9
5	30 ½	20	29, 9 ſome Ra.
6	26	16	29, 9 ſmall Ra.
7	26	17	29, 8
8	28	11	29, 9 a Fogg.
9	23	16	30, 0
10	26	20	30, 0
11	39	8	30, 0
12	40	5	29, 8
13	52	— 1	29, 4 high Wi.
14	35	6	29, 2
15	35	11	29, 4 ſome Ra.
16	24	20	29, 2 Rain.
17	39	20	29, 5 Rain.
18	39	19	29, 8
19	35 ½	17	29, 7
20	35 ½	16	29, 3
21	35	17	29, 0 Rain.
22	29	10	29, 2
23	35	5	29, 3
24	37	1	29, 2
25	35	— 5	29, 4
26	23 ½	— 8	29, 0 Snow.
27	21	—11	29, 4 Froſt.
28	24	—14	29, 3 Froſt.

690½ Grains.

March.

D.	Grain.	Ther	Barometer.
1	25	—12	29, 2 Froſt.
2	31 ½	—12	29, 1 Snow.
3	28	—13	29, 3 Sno:Froſt.
4	28	—12	29, 6 Froſt.
5	28	— 8	29, 3 Froſt.
6	20	— 1	29, 1
7	35 ½	5	29, 3 Rain.
8	39	9	29, 7
9	42 ½	8	30, 0
10	39	14	30, 0
11	33	21	30, 0
12	42	21	29, 8
13	42	22	29, 6 ½
14	46	23	29, 4
15	62 ½	14	29, 6
16	41	19	29, 5
17	42 ½	12	29, 4
18	50	10	28, 9
19	51 ½	7	29, 2
20	45	8	29, 2
21	41	7	29, 0
22	50	8	29, 4
23	37	10	29, 5
24	33 ½	6	29, 4
25	27 ½	7	29, 3
26	30	11	29, 4
27	57	9	29, 6
28	38	4	29, 6
29	30	17	29, 5
30	30	20	29, 4 ½
31	20	24	29, 3

1166 Grains.

April.

D.	Grain.	Ther	Barometer.
1	32	15	29, 4
2	29	15	29, 5
3	37 ½	14	29, 7
4	37	23	29, 6 ½
5	38	29	29, 2
6	29	32	29, 2
7	32	33	29, 3
8	32	35	29, 4
9	28 ½	40	29, 2
10	35	33	29, 4
11	37	33	29, 4
12	34	37	28, 9
13	39	32	29, 4
14	39	33	29, 5
15	39	29	29, 7
16	35	30	29, 8
17	37	31	29, 6 ½
18	36 ½	36	29, 4
19	33 ½	36	29, 3 ½
20	36	32	29, 3
21	39	37	29, 2
22	46	35	29, 4
23	42 ½	35	29, 5
24	52	35	29, 2
25	50	35	29, 3 ½
26	95	36	29, 7
27	38	44	29, 5
28	43	46	29, 7 ½
29	40	49	29, 6
30	52	42	29, 9

1203 Grains.

May.

D.	Grain.	Ther	Barometer.
1	56	36	30, 1
2	61	26	30, 0
3	66	21	30, 1
4	61	19	30, 1
5	52	31	30, 1
6	48	45	29, 8
7	59 ½	35	29, 8
8	51	34	29, 7
9	51	31	29, 6
10	43	35	29, 5
11	49	30	29, 5
12	54	32	29, 6
13	59	26	29, 7
14	59	32	29, 7 ½
15	46 ½	35	29, 7
16	46 ½	34	29, 8 ½
17	56	36	30, 1
18	70 ½	36	30, 3
19	58 ½	47	30, 1
20	76	50	30, 0
21	62	52	30, 1
22	73	64	30, 1
23	78 ½	64	30, 1
24	90	62	29, 9 ½
25	61	74	29, 9
26	67 ½	68	29, 9 ½
27	64	75	29, 9 ½
28	71	67	30, 1
29	80	69	30, 2
30	89 ½	70	30, 2
31	106	68	29, 9

1968 Grains.

June.

D.	Grain.	Ther	Barometer.
1	78	65	29, 9
2	85	62	30, 0
3	95	54	30, 2
4	77	52	30, 1 ½
5	63	50	29, 9
6	49	60	29, 7 ½
7	46	67	29, 7
8	63	63	29, 7
9	63	69	29, 8
10	63	71	29, 8
11	55	70	29, 8 ½
12	58	87	29, 8
13	59	75	29, 9
14	86	72	29, 7
15	63	79	29, 8
16	58	78	29, 9
17	86	79	30, 0
18	81	66	30, 0
19	92	57	30, 1
20	81	60	30, 0
21	80	71	29, 9
22	76	67	29, 8
23	63	69	29, 7
24	63	62	29, 6
25	57	65	29, 8
26	46	70	30, 0
27	49 ½	68	30, 0
28	52	74	30, 0
29	59	68	30, 2
30	62	69	30, 2

2008½ Grains.

July.

D.	Grain.	Ther	Barometer.
1	75	67	30, 0
2	75	67	30, 0
3	63	62	30, 0
4	62	61	30, 1
5	60	63	30, 1
6	74	65	30, 0
7	61	65	30, 0
8	51	65	30, 0
9	46	74	29, 9
10	52	77	29, 9
11	72	74	29, 8
12	74	82	29, 4
13	88	75	29, 7
14	83	62	29, 9
15	84	65	30, 1
16	84	68	29, 8
17	71	58	30, 1
18	77	65	30, 2
19	66	78	30, 1 ½
20	71	78	30, 1
21	72	82	30, 0
22	90	74	30, 0
23	99	68	30, 0
24	85	71	30, 0
25	85	81	29, 9
26	94	75	29, 9 ½
27	97	70	29, 8
28	81	78	29, 7
29	87	67	29, 9
30	78	64	29, 9
31	78	79	29, 3 ½

2335 Grains.

August.

D.	Grain.	Ther	Barometer.
1	80	71	29, 5
2	77	73	29, 6
3	77	63	29, 8
4	78	64	29, 9
5	79	73	29, 9
6	81	70	29, 9
7	94	83	29, 6
8	79	86	29, 6
9	68	82	29, 7
10	70	83	29, 8
11	92	85	29, 8 ½
12	70	80	30, 0
13	81	73	29, 9
14	68	75	29, 7
15	69	74	29, 9
16	77	72	29, 8
17	77	77	29, 7
18	84	77	29, 7
19	86	64	29, 5
20	78	68	30, 0
21	68	67	29, 7
22	71	65	29, 7
23	75	55	29, 9
24	64	54	29, 5
25	63	57	29, 5
26	58	59	29, 4
27	60	55	26, 5
28	53	55	29, 9
29	53	58	29, 7
30	53	56	29, 7
31	63	48	29, 7

2246 Grains.

September.

September.

D.	Grain.	Ther	Barometer.
1	53	53	29, 7
2	55	50	29, 6
3	61	50	29, 7
4	61	48	29, 7
5	63	44	29, 8
6	74	40	29, 7
7	62	39	29, 6
8	59	49	29, 5
9	40	52	29, 5
10	50	48	29, 6 ½
11	46	41	29, 7
12	48	43	28, 8
13	46	53	29, 7
14	43	57	29, 5
15	46	70	29, 2
16	49	54	29, 3
17	46	52	29, 1
18	52	45	29, 0
19	48	45	29, 3
20	50	44	29, 6
21	43	42	29, 9
22	41	51	29, 5
23	46	45	29, 9
24	44	52	29, 7
25	41	47	29, 8
26	43	47	29, 6
27	46	45	29, 7
28	47	40	29, 9
29	50	44	29, 8
30	40	42	29, 5

1495 Grains.

October.

D.	Grain.	Ther	Barometer.
1	40	35	29, 9
2	37	41	29, 6
3	41	35	29, 7
4	27	49	29, 6
5	29	48	30, 0
6	31	49	30, 2
7	29	58	30, 0
8	37	60	30, 0
9	39	59	30, 2
10	37	55	30, 1
11	34	55	29, 9
12	38	55	29, 8
13	39	42	30, 0
14	49	38	29, 8
15	44	28	29, 7
16	44	19	29, 7
17	35	23	29, 1
18	34	24	29, 2
19	34	20	29, 2
20	35	21	29, 5
21	35	17	29, 9
22	24	28	29, 7
23	28	25	29, 7
24	39	20	30, 0
25	41	13	30, 0
26	34	16	29, 9
27	33	13	30, 0
28	32	18	29, 8
29	33	10	29, 8
30	35	5	29, 7
31	28	7	29, 4

1095 Grains.

November.

D.	Grain.	Ther	Barometer.
1	18	22	29, 6
2	15	30	29, 7
3	24	34	29, 6
4	26	30	29, 7
5	33	21	29, 8
6	33	10	29, 8
7	29	9	29, 7
8	20	23	29, 5
9	21	21	29, 9
10	21	30	29, 7
11	32	27	29, 7
12	22 ½	34	29, 5
13	31	23	29, 4
14	25 ¼	15	28, 9
15	27	10	29, 4
16	25 ½	3	29, 6
17	26	— 7	29, 5
18	21	— 1	29, 5 great fog.
19	21	— 2	29, 5 great fog.
20	19	2	29, 6
21	15	5	29, 8 Fog.
22	11 ½	12	29, 7 ſome Ra.
23	20 ½	14	29, 7
24	24 ½	8	29, 8
25	24 ½	5	29, 9
26	33	—12	29, 9 Froſt.
27	33 ½	—12½	29, 9 Froſt.
28	27	—14	29, 8 Froſt.
29	42	—16	29, 8 } water
30	42	—17	29, 9 } frozen.

764 Grains.

December

D.	Grain.	Ther	Barometer.
1	34 ½	—16	30, 0 Froſt.
2	16 ¼	—10	30, 0 Rain.
3	12	— 0	29, 9
4	12	7	29, 4 ſome Ra.
5	17 ½	10	29, 2
6	33	15	29, 4 ſome Ra.
7	19 ½	15	29, 1 ½ (wind.
8	18	20	29 0 R & much
9	18	27	28, 6½ R.& ſtor.
10	25	16	28, 9 ſome Ra.
11	28 ¾	13	29, 6
12	28	9	29, 5
13	25	14	29, 2
14	15	20	29, 2 ſome Ra.
15	19	20	29, 5
16	22 ½	15	29, 5
17	17 ½	20	29, 5
18	21 ½	10	30, 1
19	22	3	30, 0
20	16	6	29, 8
21	14 ½	9	29, 6
22	16 ½	14	29, 3
23	22	11	28, 5 Stormy.
24	23	4	29, 0
25	22	0	29, 5 Froſt.
26	22	5	29, 2, Rain.
27	16	10	29, 3
28	20	6	29, 0
29	25 ½	0	29, 2 Froſt.
30	19 ½	5	28, 6 Stormy.
31	24	7	29, 2

646 Grains.

Note, That in the Column of the Thermometer, — denotes degrees of Cold below the freezing Point; and that from the 10th. *of* November *to the end belong to the foregoing Year* 1692.